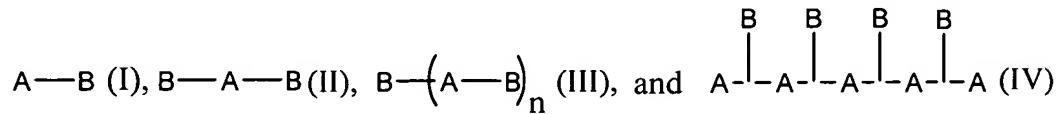


CLAIMS

What is claimed is:

1. A method for forming a poly(ester amide) (PEA) coating with enhanced mechanical and release rate properties, comprising:
 - 5 applying to an implantable device a solution or suspension of a composition comprising PEA and a low surface energy, surface blooming polymer, and forming a coating on the implantable device comprising PEA and the low surface energy, surface blooming polymer.
 2. The method of claim 1 wherein the low surface energy, surface blooming polymer is selected from the group consisting of a block copolymer comprising a block miscible with the PEA and a hydrophobic block, a polymer comprising a backbone miscible with PEA and hydrophobic pendant groups, and a combination thereof,
 - 15 wherein the hydrophobic block has a δ value below than that of PEA.
 3. The method of claim 1 wherein the low surface energy polymer is selected from the group consisting of formulae I-IV of the following structure:



wherein A is a PEA miscible block or PEA miscible backbone, and

20 wherein B is selected from the group consisting of a surface blooming block and a surface blooming pendant group.

4. The method of claim 3 wherein A is selected from the group consisting of polyurethane, poly(ester-urea) urethane, polyglycol, poly(tetramethylene glycol), poly(propylene glycol), polycaprolactone, ethylene vinyl alcohol copolymer, poly(butyl methacrylate), poly(methacrylate), poly(acrylate), poly(ether-urethane),

5 poly(ester-urethane), poly(carbonate-urethane), poly(silicone-urethane), poly(urea-urethane), poly(glycolide), poly(L-lactide), poly(l-lactide-co-glycolide), poly(D,L-lactide), poly(D,L-lactide-co-glycolide), poly(D,L-lactide-co-L-lactide), poly(glycolide-co-caprolactone), poly(D,L-lactide-co-caprolactone), poly(L-lactide-co-caprolactone), poly(dioxanone), poly(trimethylene carbonate), poly(trimethylene carbonate) copolymers, poly(3-hydroxybutyrate), poly(3-hydroxyvalerate), poly(4-hydroxybutyrate), poly(3-hydroxybutyrate-co-3-hydroxyvalerate), styrene-butadiene-styrene block copolymer, styrene-butylene/ethylene-styrene block copolymer, styrene-isobutylene-styrene triblock copolymer, poly(ethylene-co-vinyl acetate), and a combination thereof; and

15 wherein B is selected from the group consisting of a linear or branched alkyl chain, polysilanes, polysiloxanes, poly(dimethylsiloxane), a linear or branched perfluoro chain, and a combination thereof.

5. The method of claim 1 wherein the low surface energy polymer is selected from the group consisting of organosilicone surfactants, block copolymers of alkyl chains with polyglycol chains, fluoro surfactants, block copolymers of polydimethylsiloxane and polycaprolactone, polyurethanes end-capped with long chain perfluoro alcohols, poly(ester-urea)urethanes end-capped with long chain

perfluoroalcohols, polyurethanes end-capped with alkyl chains, polyurethanes end-capped with polydimethylsiloxane, copolymers of polycaprolactone and fluoroalcohols, and combinations thereof.

6. The method of any of claims 1-5 wherein the composition further
5 comprises a bioactive agent.

7. The method of claim 6 wherein the bioactive agent is selected from the group consisting of Everolimus, paclitaxel, docetaxel, estradiol, steroidal anti-inflammatory agents, antibiotics, anticancer agents, nitric oxide donors, super oxide dismutases, super oxide dismutases mimics, 4-amino-2,2,6,6-tetramethylpiperidine-1-
10 oxyl (4-amino-TEMPO), ABT-578, tacrolimus, pimecrolimus, batimastat, mycophenolic acid, clobetasol, dexamethasone, rapamycin, 40-*O*-(3-hydroxy)propyl-rapamycin, 40-*O*-[2-(2-hydroxy)ethoxy]ethyl-rapamycin, or 40-*O*-tetrazole-rapamycin, antiproliferative agents, non-steroidal anti-inflammatory agents, immunosuppressive agents, antimigratory agents, and a combination thereof.

15 8. A method for forming a poly(ester amide) (PEA) coating with enhanced mechanical and release rate properties, comprising:

applying to an implantable device a solution or suspension of a composition comprising PEA and at least one low surface energy polymer additive, and
20 forming a coating on the implantable device comprising PEA and the at least one low surface energy polymer additive.

9. The method of claim 8 wherein the at least one low surface energy polymer additive is selected from the group consisting of Teflon

(poly(tetrafluoroethylene), FEP (fluorinated ethylene-propylene),
poly(tetrafluoroethylene-co-hexafluoropropene), PVDF (polyvinylidene fluoride),
poly(fluoroalkenes), polysilanes, polysiloxanes, silicone (polydimethylsiloxane),
hydrocarbon polymers, polyethylene, polypropylene, polystyrene, polybutadiene and
5 combinations thereof.

10. The method of claims 8 or 9 wherein the composition further comprises
a bioactive agent.

11. The method of claim 10 wherein the bioactive agent is selected from
the group consisting of Everolimus, paclitaxel, docetaxel, estradiol, steroid anti-
10 inflammatory agents, antibiotics, anticancer agents, nitric oxide donors, super oxide
dismutases, super oxide dismutases mimics, 4-amino-2,2,6,6-tetramethylpiperidine-1-
oxyl (4-amino-TEMPO), ABT-578, tacrolimus, pimecrolimus, batimastat,
mycophenolic acid, clobetasol, dexamethasone, rapamycin, 40-O-(3-hydroxy)propyl-
rapamycin, 40-O-[2-(2-hydroxy)ethoxy]ethyl-rapamycin, or 40-O-tetrazole-rapamycin,
15 antiproliferative agents, non-steroidal anti-inflammatory agents, immunosuppressive
agents, antimigratory agents, and a combination thereof.

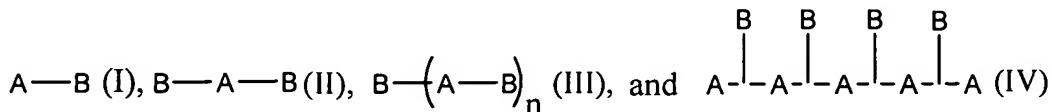
12. A coating composition for coating an implantable device comprising
poly(ester amide) (PEA) and a low surface energy, surface blooming polymer.

13. The composition of claim 13 wherein the low surface energy, surface
20 blooming polymer is selected from the group consisting of a block copolymer
comprising a block miscible with the PEA and a hydrophobic block, a polymer

comprising a backbone miscible with PEA and hydrophobic pendant groups, and a combination thereof,

wherein the hydrophobic block has a δ value below than that of PEA.

14. The composition of claim 12 wherein the low surface energy, surface 5 blooming polymer is selected from the group consisting of formulae I-IV of the following structure:



wherein A is a PEA miscible block or PEA miscible backbone, and 10 wherein B is selected from the group consisting of a surface blooming block and a surface blooming pendant group.

15. The composition of claim 14 wherein A is selected from the group consisting of polyurethane, poly(ester-urea) urethane, polyglycol, poly(tetramethylene glycol), poly(propylene glycol), polycaprolactone, ethylene vinyl alcohol copolymer, poly(butyl methacrylate), poly(methacrylate), poly(acrylate), and a combination 15 thereof; and

wherein B is selected from the group consisting of a linear or branched alkyl chain, polysilanes, polysiloxanes, poly(dimethylsiloxane), a linear or branched perfluoro chain, and a combination thereof.

16. The composition of claim 15 wherein the low surface energy, surface 20 blooming polymer is selected from the group consisting of organosilicone surfactants, block copolymers of alkyl chains with polyglycol chains, fluoro surfactants, block

copolymers of polydimethylsiloxane and polycaprolactone, polyurethanes endcapped with long chain perfluoro alcohols, poly(ester-urea)urethanes endcapped with long chain perfluoro alcohols, polyurethanes endcapped with alkyl chains, polyurethanes endcapped with polydimethylsiloxane, and combinations thereof.

5 17. The composition of any of claims 12-16 further comprising a bioactive agent.

18. The composition of claim 17 wherein the bioactive agent is selected from the group consisting of Everolimus, paclitaxel, docetaxel, estradiol, steroidial anti-inflammatory agents, antibiotics, anticancer agents, nitric oxide donors, super 10 oxide dismutases, super oxide dismutases mimics, 4-amino-2,2,6,6-tetramethylpiperidine-1-oxyl (4-amino-TEMPO), ABT-578, tacrolimus, pimecrolimus, batimastat, mycophenolic acid, clobetasol, dexamethasone, rapamycin, 40-O-(3-hydroxy)propyl-rapamycin, 40-O-[2-(2-hydroxy)ethoxy]ethyl-rapamycin, or 40-O-tetrazole-rapamycin, antiproliferative agents, non-steroidal anti-inflammatory 15 agents, immunosuppressive agents, antimigratory agents, and a combination thereof.

19. A coating composition for coating an implantable device comprising poly(ester amide) (PEA) and at least one low surface energy polymer additive.

20. The composition of claim 19 wherein the at least one low surface energy polymer additive is selected from the group consisting of Teflon (poly(tetrafluoroethylene), FEP (fluorinated ethylene-propylene), poly(tetrafluoroethylene-co-hexafluoropropene), PVDF (polyvinylidene fluoride), poly(fluoroalkenes), polysilanes, polysiloxanes, silicone (polydimethylsiloxane),

hydrocarbon polymers, polyethylene, polypropylene, polystyrene, polybutadiene and combinations thereof.

21. The composition of claims 19 or 20 further comprising a bioactive agent.

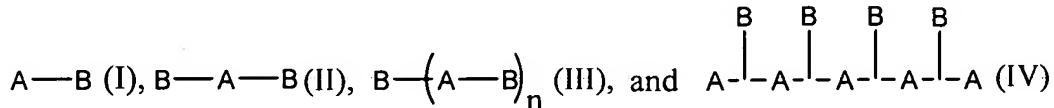
5 22. The composition of claim 21 wherein the bioactive agent is selected from the group consisting of Everolimus, paclitaxel, docetaxel, estradiol, steroidal anti-inflammatory agents, antibiotics, anticancer agents, nitric oxide donors, super oxide dismutases, super oxide dismutases mimics, 4-amino-2,2,6,6-tetramethylpiperidine-1-oxyl (4-amino-TEMPO), ABT-578, tacrolimus, 10 pimecrolimus, batimastat, mycophenolic acid, clobetasol, dexamethasone, rapamycin, 40-O-(3-hydroxy)propyl-rapamycin, 40-O-[2-(2-hydroxy)ethoxy]ethyl-rapamycin, or 40-O-tetrazole-rapamycin, antiproliferative agents, non-steroidal anti-inflammatory agents, immunosuppressive agents, antimigratory agents, and a combination thereof.

15 23. An implantable device comprising a coating which comprises a poly(ester amide) (PEA) and a low surface energy, surface blooming polymer.

24. The implantable device of claim 23 wherein the low surface energy, surface blooming polymer is selected from the group consisting of a block copolymer comprising a block miscible with the PEA and a hydrophobic block, a polymer comprising a backbone miscible with PEA and hydrophobic pendant groups, and a 20 combination thereof,

wherein the hydrophobic block has a δ value below than that of PEA.

25. The implantable device of claim 24 wherein the low surface energy, surface blooming polymer is selected from the group consisting of formulae I-IV of the following structure:



5 wherein A is a PEA miscible block or PEA miscible backbone, and
wherein B is selected from the group consisting of a surface blooming block
and a surface blooming pendant group.

26. The implantable device of claim 25 wherein A is selected from the
group consisting of polyurethane, poly(ester-urea) urethane, polyglycol,
10 poly(tetramethylene glycol), poly(propylene glycol), polycaprolactone, ethylene vinyl
alcohol copolymer, poly(butyl methacrylate), poly(methacrylate), poly(acrylate), and a
combination thereof; and

wherein B is selected from the group consisting of a linear or branched alkyl chain, polysilanes, polysiloxanes, poly(dimethylsiloxane), a linear or branched perfluoro chain, and a combination thereof.

27. The implantable device of claim 26 wherein the low surface energy, surface blooming polymer is selected from the group consisting of organosilicone surfactants, block copolymers of alkyl chains with polyglycol chains, fluoro surfactants, block copolymers of polydimethylsiloxane and polycaprolactone, 20 polyurethanes endcapped with long chain perfluoro alcohols, poly(ester-urea)urethanes endcapped with long chain perfluoro alcohols, polyurethanes

endcapped with alkyl chains, polyurethanes endcapped with polydimethylsiloxane, and combinations thereof.

28. The implantable device of any of claims 23-27 further comprising a bioactive agent.

5 29. The implantable device of claim 28 wherein the bioactive agent is selected from the group consisting of Everolimus, paclitaxel, docetaxel, estradiol, steroidal anti-inflammatory agents, antibiotics, anticancer agents, nitric oxide donors, super oxide dismutases, super oxide dismutases mimics, 4-amino-2,2,6,6-tetramethylpiperidine-1-oxyl (4-amino-TEMPO), ABT-578, tacrolimus, 10 pimecrolimus, batimastat, mycophenolic acid, clobetasol, dexamethasone, rapamycin, 40-O-(3-hydroxy)propyl-rapamycin, 40-O-[2-(2-hydroxy)ethoxy]ethyl-rapamycin, or 40-O-tetrazole-rapamycin, antiproliferative agents, non-steroidal anti-inflammatory agents, immunosuppressive agents, antimigratory agents, and a combination thereof.

15 30. An implantable device comprising a coating which comprises poly(ester amide) (PEA) and at least one low surface energy polymer additive.

31. The implantable device of claim 30 wherein the at least one low surface energy polymer additive is selected from the group consisting of Teflon (poly(tetrafluoroethylene)), FEP (fluorinated ethylene-propylene), poly(tetrafluoroethylene-co-hexafluoropropene), PVDF (polyvinylidene fluoride), 20 poly(fluoroalkenes), polysilanes, polysiloxanes, silicone (polydimethylsiloxane), hydrocarbon polymers, polyethylene, polypropylene, polystyrene, polybutadiene and combinations thereof.

32. The implantable device of claims 30 or 31 further comprising a bioactive agent.
33. The implantable device of claim 32 wherein the bioactive agent is selected from the group consisting of Everolimus, paclitaxel, docetaxel, estradiol, 5 steroidal anti-inflammatory agents, antibiotics, anticancer agents, nitric oxide donors, super oxide dismutases, super oxide dismutases mimics, 4-amino-2,2,6,6-tetramethylpiperidine-1-oxyl (4-amino-TEMPO), ABT-578, tacrolimus, pimecrolimus, batimastat, mycophenolic acid, clobetasol, dexamethasone, rapamycin, 40-O-(3-hydroxy)propyl-rapamycin, 40-O-[2-(2-hydroxy)ethoxy]ethyl-rapamycin, or 10 40-O-tetrazole-rapamycin, antiproliferative agents, non-steroidal anti-inflammatory agents, immunosuppressive agents, antimigratory agents, and a combination thereof.
34. The implantable device of claim 23 which is a stent.
35. The implantable device of claim 24 which is a stent.
36. The implantable device of claim 25 which is a stent.
- 15 37. The implantable device of claim 26 which is a stent.
38. The implantable device of claim 27 which is a stent.
39. The implantable device of claim 30 which is a stent.
40. The implantable device of claim 31 which is a stent.
41. The implantable device of claim 28 which is a drug-eluting stent.
- 20 42. The implantable device of claim 29 which is a drug-eluting stent.
43. The implantable device of claim 32 which is a drug-eluting stent.
44. The implantable device of claim 33 which is a drug-eluting stent.

45. A method of treating a disorder in a human being by implanting in the human being a stent as defined in claim 34,

wherein the disorder is selected from the group consisting of atherosclerosis, thrombosis, restenosis, hemorrhage, vascular dissection or perforation, vascular 5 aneurysm, vulnerable plaque, chronic total occlusion, claudication, anastomotic proliferation for vein and artificial grafts, bile duct obstruction, ureter obstruction, tumor obstruction, and combinations thereof.

46. A method of treating a disorder in a human being by implanting in the human being a stent as defined in claim 35,

10 wherein the disorder is selected from the group consisting of atherosclerosis, thrombosis, restenosis, hemorrhage, vascular dissection or perforation, vascular aneurysm, vulnerable plaque, chronic total occlusion, claudication, anastomotic proliferation for vein and artificial grafts, bile duct obstruction, ureter obstruction, tumor obstruction, and combinations thereof.

15 47. A method of treating a disorder in a human being by implanting in the human being a stent as defined in claim 36,

wherein the disorder is selected from the group consisting of atherosclerosis, thrombosis, restenosis, hemorrhage, vascular dissection or perforation, vascular 20 aneurysm, vulnerable plaque, chronic total occlusion, claudication, anastomotic proliferation for vein and artificial grafts, bile duct obstruction, ureter obstruction, tumor obstruction, and combinations thereof.

48. A method of treating a disorder in a human being by implanting in the human being a stent as defined in claim 37,

wherein the disorder is selected from the group consisting of atherosclerosis, thrombosis, restenosis, hemorrhage, vascular dissection or perforation, vascular 5 aneurysm, vulnerable plaque, chronic total occlusion, claudication, anastomotic proliferation for vein and artificial grafts, bile duct obstruction, ureter obstruction, tumor obstruction, and combinations thereof.

49. A method of treating a disorder in a human being by implanting in the human being a stent as defined in claim 38,

10 wherein the disorder is selected from the group consisting of atherosclerosis, thrombosis, restenosis, hemorrhage, vascular dissection or perforation, vascular aneurysm, vulnerable plaque, chronic total occlusion, claudication, anastomotic proliferation for vein and artificial grafts, bile duct obstruction, ureter obstruction, tumor obstruction, and combinations thereof.

15 50. A method of treating a disorder in a human being by implanting in the human being a stent as defined in claim 39,

wherein the disorder is selected from the group consisting of atherosclerosis, thrombosis, restenosis, hemorrhage, vascular dissection or perforation, vascular 20 aneurysm, vulnerable plaque, chronic total occlusion, claudication, anastomotic proliferation for vein and artificial grafts, bile duct obstruction, ureter obstruction, tumor obstruction, and combinations thereof.

51. A method of treating a disorder in a human being by implanting in the human being a stent as defined in claim 42,

wherein the disorder is selected from the group consisting of atherosclerosis, thrombosis, restenosis, hemorrhage, vascular dissection or perforation, vascular 5 aneurysm, vulnerable plaque, chronic total occlusion, claudication, anastomotic proliferation for vein and artificial grafts, bile duct obstruction, ureter obstruction, tumor obstruction, and combinations thereof.

52. A method of treating a disorder in a human being by implanting in the human being a stent as defined in claim 44,

10 wherein the disorder is selected from the group consisting of atherosclerosis, thrombosis, restenosis, hemorrhage, vascular dissection or perforation, vascular aneurysm, vulnerable plaque, chronic total occlusion, claudication, anastomotic proliferation for vein and artificial grafts, bile duct obstruction, ureter obstruction, tumor obstruction, and combinations thereof.

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